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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/740,751	12/19/2000	Tongbi Jiang	23804-P002C2	8773

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EXAMINER

CHANG, RICK KILTAE

ART UNIT	PAPER NUMBER
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3729

DATE MAILED: 12/10/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/740,751

Applicant(s)

JIANG ET AL.

Examiner

Rick K. Chang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 04 October 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 18, 19, 21-23, 26, 27, 29-32, 34-36, 39, 40 and 42-46 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.

- 6) ☒ Claim(s) 18, 19, 21-23, 26, 27, 29-32, 34-36, 39, 40 and 42-46 is/are rejected.

- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.

- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 18-19, 21-23, 26-27, 29-32, 34-36, 39-40, and 42-46 are rejected under 35

U.S.C. 112, first paragraph, because the specification, while being enabling for performing steps, does not reasonably provide enablement for heating and cooling steps is performed prior to forming an aperture step, inserting a pin step is performed before the heating step, inserting a pin step is performed after the cooling step, cooling step is performed before the heating step, etc.

The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. The disclosure, as originally filed, fails to provide support for the heating and cooling steps to be performed after forming the first and second materials or before forming an aperture. Further, the disclosure, as originally filed, fails to provide support for forming an electrical contact pad to be formed after forming a layer of a first material and applying an interfacial material after forming an aperture. Re claim 18: the specification does not reasonably provide enablement for forming an aperture after forming a first material and then forming a second material and then forming an aperture in the second material. Re claim 19, the specification does not reasonably provide enablement for forming a pad prior to forming the first material.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 18-19, 21-23, 26-27, 29-32, 34-36, 39-40, and 42-46 are rejected under 35

U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The limitation “in order” does not give orders to the method steps. For example, is forming an aperture in the first material and then forming an aperture in the second material and then layering the first and second layers in order? Is heating, cooling and then inserting in order (claim 31)? Further, in claim 31, is the limitation “in order” in the preamble inclusive of steps 4-6?

Claims 19 and 26: forming and applying steps lack order in relation to the forming steps. Is the contact pad formed after or before forming steps? Is the applying step performed after or before forming steps? Claims 19 and 26 have ambiguous terminology which is unclear whether later recitation of originally recited terms is intended to refer to the originally recited terms. For example, “a layer of a first material” in claim 18, line 3, “a layer of a second material” in claim 18, line 4, “a layer of a first material” in claim 19, line 2, “a layer of a first material” in claim 26, line 2, “a layer of a second material” in claim 26, line 2, “(1)” and “(2)” in claim 18 and “step (1)” and “step (2)” in claim 26. The same applies to claims 32 and 39. Where are these layers formed on?

Claim 29: what is a spin-on process. This claim lacks the required steps of spin-on process. Further, what is photo define/etching process got to do with the claims? Is define/etching means “define or etching” or “define and etching”? It sounds like the photo define/etching process removes rather than bonding the first material. This process contradicts

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the bonding process as recited in the claims. Are these two steps (spin-on and photo define/etching process) performed simultaneously or separately? Which process is performed first, second and third?

Claims 31: heating, inserting and cooling steps lack order. It is unclear when these steps are performed in relation to the forming steps. Further, it is unclear whether these steps are performed after the pin has been inserted. Is the cooling temperature higher than the heating temperature? Can the layers be cooled at higher temperature than the heating temperature? It is dubious whether the invention can perform without positive manipulative order.

NOTE: No art rejections have been applied to the claims 29, 31-32, 34-36, 39-40, and 42-46 since there are a great deal of confusion and uncertainty as to the proper interpretation of the limitations of claims. Therefore, it would not be proper to reject such claims on the basis of prior art. See MPEP 2173.06.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 18-19, 21 and 26, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Leibowitz (US 4,513,055) in view of Mikagi (US 6,274,932).

Leibowitz discloses forming a circuit board having layers 18 and 20, applying an interfacial material (22) and a polyimide (col. 3, line 27).

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Leibowitz fails to disclose forming an aperture to the first and second layers to expose the contact pad on the substrate.

Mikagi discloses forming an aperture to the first and second layers to expose the contact pad on the substrate (Fig. 2C).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Leibowitz by forming an aperture to the first and second layers to expose the contact pad on the substrate, as taught by Mikagi, for the purpose of electrically communicating with other electronic components mounted thereon a printed circuit board.

7. Claim 22, as best understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Leibowitz (US 4,513,055)/Mikagi (US 6,274,932) as applied to claim 18 above, and further in view of Merkel (US 6,187,700).

Leibowitz/Mikagi fails to disclose zirconium tungstate.

Merkel discloses providing zirconium tungstate.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Leibowitz/Mikagi by providing zirconium tungstate, as taught by Merkel, for the purpose of providing greater range of negative coefficient of thermal expansion without yarns.

8. Claim 23, as best understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Leibowitz (US 4,513,055)/Mikagi (US 6,274,932)/Merkel (US 6,187,700) as applied to claims 18 and 22 above.

Leibowitz/Mikagi/Merkel fails to disclose that zirconium tungstate is a single-crystal zirconium tungstate.

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At the time the invention was made, it would have been an obvious matter of design choice to a person of ordinary skill in the art to provide zirconium tungstate in the form of single-crystal because Applicant has not disclosed that providing zirconium tungstate in the form of single-crystal provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with zirconium tungstate because it would still provide greater range of negative coefficient of thermal expansion with heating process equally well. Therefore, it would have been an obvious matter of design choice to modify Leibowitz/Mikagi/Merkel to obtain the invention as specified in claim 23.

9. Claim 27, as best understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Leibowitz (US 4,513,055)/Mikagi (US 6,274,932) as applied to claim 18 above, and further in view of Official Notice.

Leibowitz/Mikagi fail to disclose a ceramic substrate.

Official Notice is taken that it is well known in the art to use a ceramic substrate in the process of manufacturing printed circuit board for the purpose of making the assembly weigh less than a metal substrate.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Leibowitz/Mikagi by providing a ceramic substrate, as taught by Official Notice, for the purpose of making the assembly weigh less than a metal substrate.

10. Claim 30, as best understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Leibowitz (US 4,513,055)/Mikagi (US 6,274,932) as applied to claim 18 above, and further in view of Official Notice.

Leibowitz/Mikagi fails to disclose forming the second aperture smaller than the first aperture.

Official Notice is taken that it is well known in the art to form the second aperture smaller than the first aperture for the purpose of preventing a conductive material to escaping from the aperture during assembly.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Leibowitz/Mikagi by forming the second aperture smaller than the first aperture, as taught by Official Notice, for the purpose of preventing a conductive material to escaping from the aperture during assembly.

***Response to Arguments***

11. Applicant's arguments filed 10/4/02 have been fully considered but they are not persuasive.

What steps of spin-on is used in the invention? How is this related with photo define/etch? The references recited in the argument do not shed any light as to how these two processes are intertwined. Further, the applicants' invention does deal with nanoparticles, passivation process, data sensor, magnetic recording medium, developer soluble dyed BARC, a capacitor, resistive cross point array, etc.

As to the 103 rejection, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Leibowitz by forming an aperture to the first and second layers to expose the contact pad on the substrate, as taught by Mikagi, for the purpose of electrically communicating with other electronic components mounted thereon a printed circuit board. The process of forming apertures in a printed circuit board is notoriously old and well



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known in the art. Since the applicants have the ability to obtain references as shown in the argument, Examiner suggests that the applicants do a quick search in class 29, subclasses 832, 837, 839, 846, 852. Also try class 427, subclasses 97 and 99. Applicants will find a plurality of patents with forming holes in a multilayered printed circuit board.

***Interviews After Final***

**12. Applicant note that an interview after a final rejection will not be granted unless the intended purpose and content of the interview is presented briefly, in writing (the agenda of the interview must be in writing) to clarify issues for appeal requiring only nominal further consideration. Interviews merely to restate arguments of record or to discuss new limitations will be denied. See MPEP 714.13 and 713.09.**

***Conclusion***

**13. Applicants are duly reminded that a full and proper response to this Office Action that includes any amendment to the claims and specification of the application as originally filed requires that the applicant point out the support for any amendment made to the disclosure, including the claims. See 37 CFR 1.111 and MPEP 2163.06.**

**14. THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

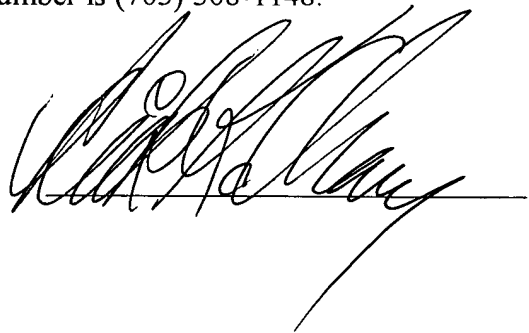
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CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rick K. Chang whose telephone number is (703) 308-4784. The examiner can normally be reached on 5:30 AM to 1:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter D. Vo can be reached on (703) 308-1789. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9302 for regular communications and (703) 872-9303 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1148.

A handwritten signature in black ink, appearing to read 'Rick K. Chang', is written over a horizontal line.

RC  
December 7, 2002